

APPENDIX B

Special-Status Species Technical Appendix

SPECIAL-STATUS SPECIES TECHNICAL APPENDIX
for the FLOOD BARRIER ALTERNATIVE of the
LOWER CACHE CREEK, YOLO COUNTY, CA, CITY OF WOODLAND AND
VICINITY POTENTIAL FLOOD DAMAGE REDUCTION PROJECT

U.S. Army Corps of Engineers, Sacramento District
State of California Reclamation Board
City of Woodland

LOCATION:

Yolo County, California
T.9N, T.10N, R2E
USGS Woodland and Grays Bend Quadrangles

Introduction

The purpose of this special-status species technical appendix is to review the proposed Lower Cache Creek Potential Flood Damage Reduction Project's Flood Barrier in sufficient detail to determine to what extent the proposed actions may affect any of the Federal and State threatened, endangered, proposed, or sensitive species listed below. Only Federally-listed endangered and threatened species and their designated critical habitat are protected under Section 7 of the Endangered Species Act. Information on other species is included in this appendix for general environmental planning purposes pursuant to NEPA and CEQA.

The species considered in this document were derived from a county species list provided by the USFWS on August 13, 2001. Another county species listed dated March 26, 2002 was provided by the USFWS in its draft Coordination Act Report. This county species list was used to update the species being considered below.

Threatened, Endangered, Proposed Threatened or Proposed Endangered Species

Birds

mountain plover (*Charadrius montanus*) **PT**
bald eagle (*Haliaeetus leucocephalus*) **T**

Reptiles

giant garter snake (*Thamnophis gigas*) **T**

Amphibians

California red-legged frog (*Rana aurora draytonii*) **T**

Fish

delta smelt (*Hypomesus transpacificus*) **T**
Central Valley steelhead (*Oncorhynchus mykiss*) **T**
winter-run chinook salmon (*Oncorhynchus tshawytscha*) **E**
Critical Habitat, winter-run chinook salmon (*Oncorhynchus tshawytscha*) **E**
Critical Habitat, Central Valley spring-run chinook (*Oncorhynchus tshawytscha*) **T**
Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*) **T**
Sacramento splittail (*Pogonichthys macrolepidotus*) **T**

Invertebrates

vernal pool fairy shrimp (*Branchinecta lynchi*) **T**
valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) **T**
vernal pool tadpole shrimp (*Lepidurus packardii*) **E**

Plants

palmate-bracted bird's-beak (*Cordylanthus palmatus*) **E**

Candidate Species, Sensitive Species and Species of Concern**Mammals**

Pacific western big-eared bat (*Corynorhinus (=Plecotus) townsendii townsendii*) **SC**
small-footed myotis bat (*Myotis ciliolabrum*) **SC**
long-eared myotis bat (*Myotis evotis*) **SC**
fringed myotis bat (*Myotis thysanodes*) **SC**
long-legged myotis bat (*Myotis volans*) **SC**
Yuma myotis bat (*Myotis yumanensis*) **SC**
San Joaquin pocket mouse (*Perognathus inornatus*) **SC**

Birds

tricolored blackbird (*Agelaius tricolor*) **SC**
western burrowing owl (*Athene cunicularia hypugea*) **SC**
Aleutian Canada goose (*Branta canadensis leucopareia*) **D**
ferruginous hawk (*Buteo regalis*) **SC**
Swainson's hawk (*Buteo swainsoni*) **CA**
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) **C**
little willow flycatcher (*Empidonax traillii brewsteri*) **CA**
American peregrine falcon (*Falco peregrinus anatum*) **D**
greater sandhill crane (*Grus canadensis tabida*) **CA**
white-faced ibis (*Plegadis chihi*) **SC**
bank swallow (*Riparia riparia*) **CA**

Reptiles

northwestern pond turtle (*Clemmys marmorata marmorata*) **SC**

Amphibians

- California tiger salamander (*Ambystoma californiense*) **C**
- western spadefoot toad (*Scaphiopus hammondi*) **SC**

Fish

- green sturgeon (*Acipenser medirostris*) **SC**
- river lamprey (*Lampetra ayresi*) **SC**
- Pacific lamprey (*Lampetra tridentata*) **SC**
- Central Valley fall/late fall-run chinook salmon (*Oncorhynchus tshawytscha*) **C**
- Critical habitat, Central Valley fall/late fall-run chinook salmon (*Oncorhynchus tshawytscha*) **C**
- Essential Fish Habitat Central Valley fall-run chinook salmon (*Oncorhynchus tshawytscha*)
- longfin smelt (*Spirinchus thaleichthys*) **SC**

Invertebrates

- Antioch Dunes anthicid beetle (*Anthicus antiochensis*) **SC**
- Sacramento anthicid beetle (*Anthicus sacramento*) **SC**
- California linderiella fairy shrimp (*Linderiella occidentalis*) **SC**

Plants

- alkali milk-vetch (*Astragalus tener* var. *tener*) **SC***
- brittlescale (*Atriplex depressa*) **SC**
- valley spearscale (*Atriplex joaquiniana*) **SC***

Additional Endangered and Threatened Species That May Occur in or be Affected by Projects in Yolo County**Birds**

- Northern spotted owl (*Strix occidentalis caurina*) **T**

Fish

- Critical habitat, delta smelt (*Hypomesus transpacificus*) **T**

Invertebrates

- Conservancy fairy shrimp, (*Branchinecta conservation*) **E**

Plants

- Colusa grass (*Neostaphia colusana*) **T**
- Solano grass (*Tuctoria mucronata*) **E**

Additional Candidate Species, Sensitive Species, and Species of Concern That May Occur in or be Affected by Projects in Yolo County**Mammals**

- greater western mastiff-bat (*Eumops perotis californicus*) **SC**

Birds

grasshopper sparrow (*Ammodramus savannarum*) **SC**
 short-eared owl (*Asio flammeus*) **SC**
 American bittern (*Botaurus lentiginosus*) **SC**
 Lawrence's goldfinch (*Carduelis lawrencei*) **SC**
 Vaux's swift (*Chaetura vauxi*) **SC**
 black tern (*chilonias niger*) **SC**
 lark sparrow (*Chondestes grammacus*) **SC**
 olive-sided flycatcher (*Contopus cooperi*) **SC**
 hermit warbler (*Dendroica occidentalis*) **SC**
 snowy egret (*Egretta thula*) **MB**
 white-tailed (=black shouldered) kite (*Elanus leucurus*) **SC**
 common loon (*Gavia immer*) **SC**
 loggerhead shrike (*Lanius ludovicianus*) **SC**
 least bittern, western (*Lxobrychus exilis hesperis*) **SC**
 Lewis' woodpecker (*Melanerpes lewis*) **SC**
 long-billed curlew (*Numenius americanus*) **SC**
 rufous hummingbird (*Selasphorus rufus*) **SC**
 read-breasted sapsucker (*Sphyrapicus rubber*) **SC**
 Bewick's wren (*Thryomanes bewickii*) **SC**
 California Thrasher (*Toxostoma redivivum*) **SC**

Amphibians

foothill yellow-legged frog (*Rana boylii*) **SC**

Invertebrates

Midvalley fairy shrimp (*Branchinecta mesovallensis*) **SC**
 brownish dubiraphian riffle beetle (*Dubiraphia brunnescens*) **SC**

Plants

Ferris's milk-vetch (*Astragalus tener* var. *ferrisiae*) **SC***
 Snow Mountain buckwheat (*Eriogonum nervulosum*) **SC**
 adobe lily (*Fritillaria pluriflora*) **SC**
 drymaria dwarf-flax (*Hesperolinon drymarioides*) **SC**
 Northern California black walnut (*Juglans californica* var. *hindsii*) **SC***
 Hall's madia (*Madia hallii*) **SC**

Key:

E	<i>Endangered</i>	Listed (in the Federal Register) as being in danger of extinction.
T	<i>Threatened</i>	Listed as likely to become endangered within the foreseeable future.
P	<i>Proposed</i>	Officially proposed (in the Federal Register) for listing as endangered or threatened.
PX	<i>Proposed Critical Habitat</i>	Proposed as an area essential to the conservation of the Species.
C	<i>Candidate</i>	Candidate to become a <i>proposed</i> species.

SC	<i>Species of Concern</i>	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
MB	<i>Migratory Bird</i>	Migratory Bird
D	<i>Delisted</i>	Delisted. Status to be monitored for 5 years.
CA	<i>State-Listed</i>	Listed as Threatened or endangered by the State of California.
*	<i>Extirpated</i>	Possibly extirpated from this quad.
**	<i>Extinct</i>	Possibly extinct.
	<i>Critical Habitat</i>	Area essential to the conservation of a species.

For most of these species, no potential habitat exists within the project area. Several of the species such as the mountain plover have been known to exist in or near the project area; however, they would not be impacted by the proposed project. Several other species such as the palmate-bracted bird's beak are located near the project area and may be impacted by cumulative actions; therefore they are included in the impacts analysis provided here.

Critical Habitat and Essential Fish Habitat

The National Marine Fisheries Service has published a final rule on Critical Habitat for the California Central Valley steelhead (*Oncorhynchus mykiss*) on February 16, 2000 (65 FR 7764). An April 30, 2002 court ruling has vacated this critical habitat for the CCV ESU.

The action also falls within Essential Fish Habitat (EFH) for the Central Valley fall-run chinook salmon as identified by the amendment to the Pacific Salmon Fishery Management Plan, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

Consultation to Date

The USFWS, in collaboration with study personnel, has completed a draft Coordination Act Report (CAR) for the study. Also, species list were received from the USFWS (August 13, 2001 and March 26, 2002) and National Marine Fisheries Service (NMFS) (January 10, 2002).

Action Area

Areas affected directly or indirectly by the proposed Flood Barrier alternative include the entire area north of the Flood Barrier and south of Cache Creek, especially the area between CR 102 and the CCSB that would experience an increase in flood depth, duration, and frequency. Also, the west levee and the training levee of the Settling Basin, and the Settling Basin itself will be impacted by the project.

Both the City of Woodland General Plan and the Yolo County General Plan have been used to determine the existing conditions of the action area. Chapter 3, Affected Environment, of the Lower Cache Creek, Yolo County, CA, Woodland and Vicinity, Potential Flood Damage Reduction Project Draft Environmental Impact Statement/Environmental Impact Report (LCC DEIS/EIR) discusses current conditions.

Description of the Proposed Action

The Flood Barrier (FB) would extend 6 miles from CR 96B to the CCSB just north of the City of Woodland. The area between the Flood Barrier and Cache Creek, which is currently a portion of the existing flood plain, would serve as a flood bypass. The FB would vary from one foot in elevation above road surface at CR 96B to 18 feet in height at the west levee of CCSB. A 350 cfs toe drain would be constructed on the flood side of the FB to serve internal drainage requirements of normal rainfall events and agricultural field runoff. A 12-foot bench would separate the drainage channel from the FB. Culverts would be placed at road and railroad crossings. Existing roads would be raised to match the top of levee elevation of the FB where possible. Where roads cannot be raised sufficiently, stop log structures would be constructed to provide closure in levee gaps. A stop log structure would be provided at the California Northern Railroad opening in the I-5 embankment. Provisions would be made to protect homes and structures within the associated flood plain.

An inlet weir similar to the existing weir in the east levee of the Settling Basin would be constructed in the west levee of the Settling Basin. A 3,000-foot section of the west levee would be removed for installation of the inlet weir. A portion of the training levee in the CCSB would also be removed from the northern end of the inlet weir to the southern end of the training levee (approximately 5,250 feet). Culverts with flapgates would be installed through the west levee just north of the FB and south of the inlet weir to allow ponded water to drain into the Settling Basin. Gated culverts would also be provided through the flood barrier levee to allow local runoff in the North Canal to drain south during non-flood periods.

The remaining portion of the west levee of the Settling Basin to CR 102 would be improved. The side slope on west side of this levee would be decreased from a 2h:1v to a 3h:1v side slope. Slope protection (riprap) would be added to the western slope of the west levee from the FB to approximately the intersection of CR 102 and Cache Creek. Additionally, slope protection would be added to the waterside of the Flood Barrier levee from CR 101 to the intersection of the FB and the CCSB west levee to protect against wave damage during periods of ponding. Slope protection would also be added to the embankment of I-5 where overtopping occurs at the juncture of the FB and I-5. This slope protection would extend 1,100 feet north on both the east and west embankments of I-5.

As under the No-Action alternative, the DWR would continue to maintain the existing Cache Creek levee system. Because the existing system is designed for a relatively low level of protection, and because serious erosion of the levee banks is occurring, flood fighting (including installation of armoring) and repair are expected to be routine activities. The installation of rock armoring is expected to cumulatively impact significant portions of the stream channel. DWR's routine and emergency maintenance activities will continue to be governed by the Endangered Species Act.

Project Footprint & Potential Habitat

The Flood Barrier footprint and road crossings cover approximately 121.9 acres of agricultural land and 11.2 acres of existing roads and railroads, and would remove 100 native and non-native trees. Riprap associated with floodproofing I-5 where it overtops at the juncture of the FB and I-5 will remove 0.52 acres of upland habitat. Riprap associated with the Flood Barrier will cover 22.7 acres of the existing western slope of the west levee of the Settling Basin and the northern slope of the Flood Barrier. The western slope of the west levee of the Settling Basin is existing potential GGS upland habitat. The Flood Barrier levee footprint will remove potential upland habitat for the giant garter snake associated with agricultural drainage ditches (potential GGS aquatic habitat). Construction of the Flood Barrier will also impact 17,000 feet of agricultural drainage ditch considered aquatic habitat for the giant garter snake. The removal of 5,250 feet of the training levee and 3,000 feet of the west levee will impact an additional 15.9 acres of upland giant garter snake habitat and 0.28 acres of scrub shrub. The placement of temporary culverts within the low-flow channel of the Settling Basin will impact approximately 0.33 acres of in-stream habitat.

Federal

Potential habitat for Federally-listed giant garter snake, valley elderberry longhorn beetle, chinook salmon, and steelhead occurs within the project area, including: (1) several drainage ditches (see Figure 1) as potential giant garter snake aquatic habitat, (2) potential upland habitat for the snake along the existing levees, (3) numerous elderberry shrubs along Cache Creek that serve as potential valley elderberry longhorn beetle habitat, and (4) Cache Creek as potential habitat for giant garter snake, chinook salmon, and steelhead. Several disturbed alkaline areas that could potentially support the federally endangered palmate-bracted bird's beak occur just south of the Flood Barrier. Although these disturbed alkaline areas are not within the project area, this species is mentioned within this special-status species technical appendix due to the plant's sensitive nature and the presence of potential habitat in close proximity to the project footprint.

State

Potential habitat for State listed Swainson's hawk, bank swallow, and northwestern pond turtle, occurs within the project area, including: (1) numerous large trees within and adjacent to the FB footprint which could serve as nesting sites for Swainson's hawk, (2) adjacent agricultural fields serving as hawk foraging habitat, (3) several steep banks along Cache Creek that could potentially serve as bank swallow nesting habitat, (4) potential upland habitat for the turtle along Cache Creek, and (5) Cache Creek and the low-flow channel as potential aquatic habitat for northwestern pond turtle.

Species Accounts and Status of the Species in the Action Area

Federal

Giant Garter Snake (*Thamnophis gigas*) – the giant garter snake (GGS) is a state (6/27/1971) and federally-listed (10/20/1993) threatened species. It historically ranged throughout the Central Valley, but is currently extirpated from Fresno County southward. During the winter (the snake's dormant season) and at night it typically inhabits upland, small mammal burrows and other soil crevices. Daytime and active season (early spring through mid-fall) habitats include aquatic sites, emergent vegetation, and grassy banks along agricultural wetlands, irrigation and drainage canals, sloughs, ponds, small lakes, and low gradient streams. The GGS feeds on fish, amphibians, and amphibian larvae.

Giant garter snakes bare live young between mid-July and September. These young then disperse immediately after birth, thereby eliminating any need by the GGS for nesting sites.

The snake rapidly retreats to water if disturbed.

The decline of the GGS is attributable to habitat loss through flood control and agricultural activities. Critical habitat for the GGS has been proposed (9/9/2000), however none occurs within the project area. A field survey for GGS habitat was undertaken by Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs on 14 September 2001. During a 15 October 2001 survey for *Cordylanthus palmatus* additional observations were made on GGS habitat. The northern boundary of the study area includes an 11-mile stretch of Lower Cache Creek. The southern boundary is located 0.5 mile north of Kentucky Ave. and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture.

The survey logged five areas of potential GGS habitat: 1.) bed and bank of Cache Creek and the levees adjacent to the Creek; 2.) agricultural ditch between CR 101 and CR 102; 3.) agricultural ditch between CR 102 and the Cache Creek west levee; 4.) narrow channel east of CR 102 on the south side of the farm road (levee); and 5.) agricultural ditch located at the base of the north-south segment of the Cache Creek west levee.

The USFWS indicated in its Coordination Act Report (CAR) that it considers Cache Creek as potential aquatic GGS habitat. All habitat located within 200 feet of the creek would be considered potential upland GGS habitat. The USFWS also considers the training levee and west levee of the CCSB and its associated agricultural drainages as potential aquatic and upland habitat.

Although there is no record of GGS within the project area, the California Natural Diversity Database (CNDDB) contains the following records for GGS on lands just south and west of the Cache Creek settling basin in the Gray's Bend quadrangle: (1) County Road 25 at Willow Slough, south of the Cache Creek settling basin (1987), (2) County Road 22 in the center of the Yolo Bypass, southeast of the Cache Creek settling basin (1987), (3) along the Tule irrigation canal approximately 1.5 miles south of I-5 at the Sacramento River (1999).



Figure 1

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) – the VELB, federally-listed (8/8/1980) as threatened, is entirely dependent upon the elderberry (*Sambucus spp.*) as its host plant. The beetle is a wood borer that emerges from late March through June to feed, reproduce, and deposit its eggs within crevices in the bark of the elderberry shrub. Once the larva hatch, they bore into the wood where they spend 1-2 years feeding on the shrub's pith, before exiting the plant as adults. The adults are active from March to June, mating and feeding on the elderberry leaves and flowers.

The VELB is endemic to Central Valley riparian forests that occur along rivers and streams. These areas are typically the first settled and are often converted entirely for human uses such as agriculture. Some estimates place the extent of destruction at 89% for Central Valley riparian forest habitat.

Critical habitat (8/8/1980) for the VELB does not exist within the project area.

A survey for presence of the VELB was completed by CDM biologist John Downs. The entire project site was surveyed for the presence of elderberry shrubs. No shrubs were found near the Flood Barrier project area. In the setback levee project areas, stem sizes, numbers, and beetle presence was estimated at the road crossings where shrubs are expected to be taken. Estimates were made by making a quick count of stems in clumps occurring less than 100 ft from the project area. Survey results indicate that VELB exist holes are present within elderberry shrubs along Cache Creek.

The CNDDDB contains the following record of VELB adjacent to the project area within the Woodland quadrangle: (1) along the south bank of Cache Creek on the west side of County Road 94B, approximately 5 miles west of Woodland.

Palmate-bracted Bird's Beak (*Cordylanthus palmatus*) – is a state (5/1984) and federally-listed (7/1/1986) endangered annual plant that occurs along the edges of channels and drainages on seasonally-flooded, saline-alkali soils below 500 feet. Individuals can also be found in alkali scalds (barren areas with a surface crust of salts) and grassy areas. Currently seven metapopulations exist in California. Four can be found in the Sacramento Valley, one in the Livermore Valley, and two in the San Joaquin Valley.

The palmate-bracted bird's beak is a hemiparasitic plant. It manufactures its own food but depends upon saltgrass (*Distichlis spicata*) (believed to be its host plant) for water and nutrients. It flowers from May until October, depending upon bees for pollination. It is a highly prolific seed producer, therefore forming a lasting seedbank. However, annual plant numbers vary depending on environmental conditions. The USFWS recommends a multi-season survey to account for population fluctuations.

Current population declines result from detrimental land use practices such as agriculture, livestock grazing, and urbanization. A field survey for *Cordylanthus palmatus* habitat was undertaken by Sycamore Environmental biologist Dr. John Little and CDM biologist John Downs on 15 October 2001. During a 14 September 2001 survey for *Thamnophis gigas* additional observations were made on *C. palmatus* habitat. The northern boundary of the study

area includes an 11-mile stretch of Lower Cache Creek. The southern boundary is located 0.5 mile north of Kentucky Ave. and extends for 5.7 miles. The land between these two boundaries consists mostly of agriculture. The survey focused on areas mapped as Pescadero silty clay soils. Disturbed alkaline areas within abandoned rice fields south of the Flood Barrier and east of CR 102, provides some of the best potential habitat in or adjacent to the study corridors. However, these alkaline habitats are located outside the project boundary and therefore would not be affected by construction.

Although there were no direct observations of *C. palmatus* during surveys and there is no record of the palmate-bracted birds beak within the project area, the CNDDDB contains the following records of *C. palmatus* adjacent to the project area within the Gray's Bend quadrangle: (1) at the junction of County Road 103 and County Road 25 between Woodland and Davis, (2) about 1.5 miles east of Woodland in the vicinity of sewage disposal units, (3) on the Brauner site north of County Road 25 and east of County Road 102.

Central Valley Chinook Salmon (*Oncorhynchus tshawytscha*) – The various runs of the Central Valley chinook salmon were determined by the USFWS and NMFS to be candidate (fall/late fall), endangered (winter), and threatened (spring) species. The chinook salmon is an anadromous and semelparous (spawns only once then dies) fish that spends up to 2 years as a juvenile in freshwater before returning to the ocean. It then spends up to 6 years in the marine environment before returning to its home stream to spawn and then die.

There are different seasonal runs or modes in the migration of chinook salmon from the ocean to freshwater. The fall/late fall-run chinook salmon was historically found within Cache Creek between July and April. The winter-run chinook salmon was historically found within Cache Creek between December and July. The spring-run chinook salmon would be found within Sacramento River (but not Cache Creek) between April and October. Fish sampling for mercury studies conducted by Darell Slotton and Shaun Ayers in the fall of 2000 turned up evidence of three adult salmon and a redd within Lower Cache Creek between Interstate 505 and SH 113 (Moyle, Peter, pers comm., 2002).

NMFS considers Cache Creek to be essential fish habitat for the Central Valley fall-run chinook salmon.

Steelhead Trout – California Central Valley (CCV) ESU (*Oncorhynchus mykiss*) - The steelhead is currently Federally-listed as threatened (March 19, 1998) in the Central Valley region. Steelhead trout are an anadromous form of rainbow trout. The fish spends one to four growing seasons in the ocean before returning to spawn for the first time. Steelhead seek out small streams and tributaries where cool, well oxygenated water, and gravelly stream channels occur in order to lay their eggs. Cover in the form of deep pools, overhanging and submerged vegetation, undercut banks and submerged debris is also important for the protection of spawning and hatching steelhead. The CCV ESU generally spends up to its first three years of life in freshwater before migrating to the ocean between March and June. Unlike other anadromous pacific salmonids, steelhead may survive spawning and return to the ocean to spawn again a later year.

Critical habitat has been designated for the CCV ESU (February 16, 2000) to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and their tributaries, including lower Cache Creek (Hydrologic Unit 18020110) (NMFS, 2002). An April 30, 2002 court ruling has vacated this critical habitat for the CCV ESU.

State

Swainson's Hawk (*Buteo swainsoni*) – the Swainson's hawk was listed by the State of California as threatened on May 17, 1983. Currently, it migrates north into California from March through May; breeds from late March to late August in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen Co., and Mojave Desert; and then returns to Central America by the end of October. The hawk uses scattered, large trees in juniper-sage flats, riparian areas, and oak savannah to raise one brood per year with its monogamous mate. Adjacent grasslands, grain fields, and pastures provide foraging areas for mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and rarely fish.

The Swainson's hawk is considered an uncommon to locally common breeding resident and migrant. A total California population of 375 pairs and 110 breeding pairs was estimated by Bloom (1980). The California Department of Fish and Game (CDFG) estimates up to 1,000 pairs occur within the state. (Woodbridge, 2001) These numbers signify a decline across the state of up to 90% of their historical population (Bloom, 1980). Declines in Swainson's hawk populations are ascribed, in part, to the loss of nesting habitat.

There are numerous documented occurrences of Swainson's hawks within the project area. These hawks can be habituated to human activity, such as crop cultivation, if the activity is consistent. Disturbances, particularly during the breeding season, may include construction actions (a change in current activity routine) and personnel near nesting sites. These disturbances during pre-nesting, egg laying, and incubation could result in nest abandonment.

Bank Swallow (*Riparia riparia*) – the bank swallow is a State-listed (6/11/1989) threatened species that migrates into California from South America in March through May. It spends the summer breeding in Northern and Central California before heading back south for the winter. The swallow is found primarily in riparian and other lowland habitats. It digs nesting holes into vertical banks, bluffs, and cliffs with fine-textured or sandy soils. Foraging habitat includes open riparian areas, brushland, grassland, wetland, water, and cropland.

The Bank Swallow is considered a locally common to uncommon breeding resident and migrant. A total California population of approximately 100 breeding colonies exists. The Sacramento River, between Redding and the Yolo Bypass, contained approximately 50% of the breeding population as of 1987 (Garrison, 2001).

There are documented occurrences of bank swallows within the project area, including observations of birds in flight by project personnel during site visits. A relatively large breeding population has recently been found along Cache Creek (T. and J. Heindel, personal communication with Garrison, 2001). Breeding bank swallow populations seem to be fairly

tolerant of moderate levels of human activity. Bank swallow susceptibility is primarily tied to habitat losses of their nesting banks from flood control measures.

Northwestern Pond Turtle (*Clemmys marmorata marmorata*) - the northwestern pond turtle is a California Species of Special Concern. It is common to uncommon throughout California, west of the Sierra-Cascade crest. It inhabits aquatic areas with plentiful hiding and basking sites. A permanent water source is necessary to avoid desiccation, especially for hatchlings. Underwater bottom mud or upland habitat is used for hibernation in colder areas. Upland habitat is used for aestivation and reproduction. The turtle seeks aquatic plant material, beetles, aquatic invertebrates, fishes, and frogs for a food source.

Mating for northwestern pond turtles begins in late April and goes through early May. Oviposition typically occurs during May and June on upland habitats that average 200m from the turtle's aquatic habitat (CDFG, 2001). The hatchlings, it is assumed, spend the winter within the nest, and emerge the following spring. Loss of upland nesting habitat through human disturbance is a potential source for the turtles' decline.

There are documented occurrences of the turtle within the stock ponds and stream habitats of the project area.

Effects of the Proposed Action

This section is intended to identify any potential adverse project-related effects on special-status species. Project effects on special-status species would be both temporary and permanent. Temporary effects would result from construction activities, while permanent effects would result from new flood control structures.

Under criteria based on the State CEQA Guidelines, the proposed project would be considered to have a significant effect on special-status species if it would result in any of the following:

- Interfere substantially with the movement of any resident or migratory fish species or impede use of nursery sites.
- An adverse effect, either directly or through habitat modifications, to any endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (sections 17.11 or 17.12).
- A substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the DFG or USFWS.

This section forms the analytical framework for analyzing the effects of the Flood Barrier alternative on biological resources in the study area. The existing conditions (and future without project conditions where different) described in Chapter 3 of the draft EIS/EIR are compared with future conditions with the project alternatives in place. The baseline and with-project

comparisons show the probable consequences (effects) of the Flood Barrier on special-status species. Direct and indirect effects for each described species are detailed. Cumulative effects from the project will be discussed in the following section.

Federal

Giant Garter Snake

- a.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:
- Evaluation of Giant Garter Snake Habitat for Lower Cache Creek Flood Damage Reduction Study, Yolo County, CA. John Little, Sycamore Environmental.
 - Giant Garter Snake *Thamnophis gigas*. Wildlife Habitat Relationships System. California Department of Fish & Game.
 - Giant Garter Snake *Thamnophis gigas*. US Fish & Wildlife Service, Sacramento Field Office.
 - Programmatic Formal Consultation for US Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California. United States Department of the Interior. Fish & Wildlife Service.
- b.) *Direct Effects* – The construction of the FB will impact 17,000 feet of agricultural drainage ditch and associated upland habitat. Also, the rock armoring of the landside of the Settling Basin west levee and the north side of the newly constructed FB from CR 101 to the settling basin, and removal of 3,000 feet of the west levee and 5,250 feet of the training levee, will impact 26.8 acres of upland habitat. If there is construction activity in the winter, hibernating snakes may be mortally impacted. Noise from construction may harass the snakes. A haul route for removal of 5,250 feet of the CCSB training levee will be constructed across the low-flow channel of Cache Creek. This activity would include the placement of culverts beneath the haul route to ensure continuous flow of the creek. Although the haul route will be temporary it has the potential to impact aquatic and upland GGS habitat.
- Construction of project features (e.g. slope and toe drain channel of the Flood Barrier) will offset some losses of potential habitat.
- c.) *Indirect Effects* – Future levee maintenance may impact any GGS overwintering/overwintering in burrows on the levees.

Valley Elderberry Longhorn Beetle

- a.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:

- Conservation Guidelines for the Valley Elderberry Longhorn Beetle. United States Department of the Interior. Fish & Wildlife Service.
- Riparian Habitat Fragmentation and the Valley Elderberry Longhorn Beetle, Sacramento Valley, California. Biological Conservation, Collinge, *et.al*.
- Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*. US Fish & Wildlife Service, Sacramento Field Office.
- Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle within the Jurisdiction of the Sacramento Field Office, California. United States Department of the Interior. Fish & Wildlife Service.

b.) *Direct Effects* – None, habitat does not exist within the action area.

c.) *Indirect Effects* – None, habitat does not exist within the action area.

Palmate-bracted Bird's Beak

a.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:

- Draft Botanical Survey Report for a Federal and State Endangered Plant Species: *Cordylanthus palmatus* (palmate-bracted bird's-beak) for the Lower Cache Creek Flood Damage Reduction Study Yolo County, CA. John Little, Sycamore Environmental.
- Palmate-Bracted bird's-beak *Cordylanthus palmatus*. California State University Stanislaus. Bioweb.
- Palmate-bracted Bird's-Beak (*Cordylanthus palmatus*). US Fish & Wildlife Service, Sacramento Field Office.

b.) *Direct Effects* – None, habitat does not exist within the action area.

c.) *Indirect Effects* – None, habitat does not exist within the action area.

Central Valley Chinook Salmon

a.) *Effects Analysis Methodology* – The Action Agency has relied upon the following documents to determine effects and conservation measures:

- Chinook Salmon (*Oncorhynchus tshawytscha*) Endangered, Threatened, and Candidate Species. National Marine Fisheries Service, Office of Protected Resources.
- Fact Sheet West Coast Chinook Salmon *September 1999*. National Marine Fisheries Service, Southwest Region.
- Wildlife Gallery – Anadromous Species Resources. Chinook Salmon *Oncorhynchus tshawytscha*. California Department of Fish and Game, Central Valley Bay-Delta Branch Division.

- Guidelines for Salmonid Passage at Stream Crossings - September 2001. National Marine Fisheries Service.
- b.) *Direct Effects* – A haul route for removal of 5,250 feet of the CCSB training levee will be constructed across the low-flow channel of the CCSB. This activity will include the placement of culverts beneath the haul route to ensure continuous flow of the creek. Although the haul route will be temporary and removed it has the potential to impact Central Valley chinook salmon habitat.
- c.) *Indirect Effects* – There are no indirect effects.

California Central Valley Steelhead

- a.) *Effects Analysis Methodology* – The Action Agency has relied upon the following documents to determine effects and conservation measures:
- Steelhead *Oncorhynchus mykiss*, Central Valley, California ESU Listed Threatened March 1998. National Marine Fisheries Service.
 - Designated Critical Habitat: Critical habitat for 19 Evolutionary Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California. Department of Commerce. National Atmospheric and Oceanic Administration. Federal Register Vol. 65 No.32.
- b.) *Direct Effects* – A haul route for removal of 5,250 feet of the CCSB training levee will be constructed across the low-flow channel of the Cache Creek Settling Basin. This activity will include the placement of culverts beneath the haul route to ensure continuous flow of the creek. Although the haul route will be temporary and removed it has the potential to impact Central Valley steelhead habitat.
- c.) *Indirect Effects* – There are no indirect effects.

State

Swainson's Hawk

- a.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:
- Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley. Swainson's Hawk Technical Advisory Committee.
 - Swainson's Hawk *Buteo swainsoni*. Wildlife Habitat Relationships System. California Department of Fish & Game.
 - Swainson's Hawk (*Buteo swainsoni*). California Partners in Flight Riparian Bird Conservation Plan for the Swainson's Hawk.

- b.) *Direct Effects* – Swainson's hawks will be susceptible to disturbance due to construction and personnel activities, especially during the nesting season. A loss of nesting and foraging habitat through construction is also a potential direct effect.
- c.) *Indirect Effects* – Future maintenance activities, especially if conducted during nesting season, may harass the Swainson's hawk, and may require removal of habitat.

Bank Swallow

- b.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:
 - Bank Swallow *Riparia riparia*. Wildlife Habitat Relationships System. California Department of Fish & Game.
 - Bank Swallow. California Partners in Flight Riparian Bird Conservation Plan.
- c.) *Direct Effects* – None, habitat does not exist within the action area.
- d.) *Indirect Effects* – None, habitat does not exist within the action area.

Northwestern Pond Turtle

- a.) *Effects Analysis Methodology* – The Corps has relied upon the following documents to determine effects and conservation measures:
 - Western Pond Turtle *Clemmys marmorata*. Wildlife Habitat Relationships System. California Department of Fish & Game.
 - Northwestern Pond Turtle *Clemmys marmorata marmorata*. California Department of Fish & Game. Habitat Conservation Branch.
- b.) *Direct Effects* – A haul route for removal of 5,250 feet of the CCSB training levee will be constructed across the low-flow channel of Cache Creek. This activity will include the placement of culverts beneath the haul route to ensure continuous flow of the creek. Although the haul route will be temporary and removed it has the potential to impact aquatic and upland northwestern pond turtle habitat.
- c.) *Indirect Effects* – There are no indirect effects.

Cumulative Effects

Past developments, including urban and agricultural growth within the study area, have created extensive losses of natural terrestrial habitat and native species. Numerous past water projects have also added to these losses by altering the hydrology of and reducing flows within Cache Creek, degrading aquatic habitat and causing a loss in the diversity of native aquatic species. Future urban and industrial development, and a continued agricultural presence throughout the

study area in combination with this project have the potential to create some detrimental cumulative effects to listed and candidate species. These effects are outlined below.

The Flood Barrier Alternative includes the removal of 5,250 ft of the training levee in the CCSB. During the years following construction, sediment deposits would continue within the CCSB, requiring removal of additional sections of the training levee. This would result in further loss of upland giant garter snake habitat.

Operation and maintenance for the existing levee system will continue after construction of the Flood Barrier although the Flood Barrier is not dependent upon maintenance of the existing levees. Erosion control measures such as rock armoring may be undertaken by DWR covering as much as 5 miles of riparian and stream habitat that serves as potential habitat for the Swainson's hawk, bank swallow, giant garter snake, northwestern pond turtle, valley elderberry longhorn beetle, chinook salmon, and steelhead.

Mercury will continue to be introduced into the study area via Cache Creek. The mercury that settles out would add to the mercury concentration in the CCSB itself. The remainder of the mercury would travel through the Yolo Bypass and what doesn't deposit there will be deposited in the Delta. During large storm events under the No-Action or Flood Barrier Alternatives, stream water carrying mercury would overtop the levees and deposit the mercury on the agricultural land. It is not known exactly what affect mercury contamination from Cache Creek has upon wildlife.

The Flood Barrier would allow development to continue to the east and south of the City of Woodland. *Cordylanthus palmatus* has been documented in this area, and may be impacted by future industrial development.

Avoidance Areas and Conservation Measures

Avoidance Areas

Areas that will be avoided with the Flood Barrier alternative include an existing drainage ditch on the south side of the barrier between CR 101 and the Settling Basin. The ditch is potential giant garter snake habitat. Existing stands of mature trees near I-5 and the railroad will also be avoided as potential Swainson's hawk habitat.

Conservation Measures

Federal

The valley elderberry longhorn beetle, and palmate-bracted bird's beak will not be affected due to construction of the Flood Barrier; therefore, no conservation measures are being suggested.

The following conservation measures for the giant garter snake include those taken from the *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno,*

Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California.

The final determination of specific conservation measures will be determined during consultation with the USFWS. Measures include:

- Seasonal restrictions (construction from May 1 to October 1 only) to avoid overwintering giant garter snakes;
- Ensuring that dewatered habitat remains dry for at least 15 consecutive days after April 15 and prior to excavation or filling;
- An environmental awareness program for construction workers;
- Completion of pre-construction surveys 24 hours prior to commencement of construction by a qualified biologist, who will remain available thereafter to provide additional services should a snake be encountered during construction;
- The halting of all construction activities within the area should a giant garter snake be encountered during construction until the snake has had time to move away from the area;
- The confinement of construction activities to the minimal area necessary to facilitate construction;
- The flagging and avoidance of areas that will not be impacted by construction and are designated Environmentally Sensitive to the giant garter snake;
- The restoration of all riprap areas to upland habitat by placing at least an 18-24 inch layer of soil over the rock and reseeding the area with native grasses and forbs; and
- The compensation of lost habitat according to ratios agreed upon between the Corps and the USFWS.

Conservation measures for chinook salmon and steelhead are based on the recommendations outlined in the *Guidelines for Salmonid Passage at Stream Crossings*. In addition to guidance specific to culverts, the following general conservation measures will be observed:

- The minimization of erosion and sediment delivery through the use of erosion control devices such as hay bales, water bars, covers, and sediment fences where necessary and appropriate;
- The restriction of access to sensitive-areas to minimize streamside habitat impacts;
- The installation of culverts in a de-watered site with a sediment control and flow routing plan;
- The use of pumps with fish screens to dewater the site; and
- The restoration of the impacted area to pre-project conditions including reseeding using locally native riparian and other vegetation.

State

The bank swallow will not be affected due to construction of the Flood Barrier; therefore, no conservation measures are being suggested.

Conservation measures for Swainson's hawks will include

- The replacement of non-native trees at a 1:1 ratio and native trees at a 5:1 ratio. Both non-native and native trees lost will be replaced with native trees.
- Pre-construction surveys conducted according to Swainson's Hawk Technical Advisory Committee guidelines (2000); and
- The prohibition of construction activities within 1/2 mile of a nesting hawk until young fledge.

Conservation measures for the giant garter snake will provide sufficient avoidance, minimization, and mitigation measures for the northwestern pond turtle.

Conclusion and Determination

The purpose of this Technical Biological Appendix is to review the proposed Lower Cache Creek, Yolo County, CA, Woodland and Vicinity, Flood Damage Reduction Study in sufficient detail to determine to what extent the proposed actions may affect any threatened, endangered, proposed, or sensitive species within the project area.

Summary of Effects

Federal

Construction of the FB may affect two Federally listed species through direct and indirect effects (see Table 4), and five Federally-listed species through cumulative effects.

There is potential aquatic and upland GGS habitat within the CCSB, within and adjacent to agricultural drainage ditches throughout the action area, and along the west levee of the CCSB. The construction of the toe drain and the Flood Barrier levee would impact 17,000 feet of aquatic and associated upland habitat through the removal of drainage ditches and adjacent uplands. Also, the removal of 5,250 ft of the training levee within the CCSB, the removal of 3,000 feet of the west levee, and the rock armoring of the remainder of the west levee would impact potential GGS upland habitat. However, through conservation measures (as outlined in the terms and conditions section of the *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California*) such as pre-construction surveys, seasonal construction restrictions, and habitat replacement including covering all riprap with soils and reseeding with native grasses and forbs, any potentially adverse affects can be minimized. A Habitat Mitigation Alternatives Analysis has been developed by the Corps to identify the least cost mitigation plan that would effectively meet both the anticipated incidental take conditions and the minor remaining general wildlife habitat mitigation recommendations. This document can be found as Appendix I within the Lower Cache Creek draft EIS/EIR. Cumulative affects would include the future rock armoring of the streambank by the DWR. Both potential aquatic and upland habitat would be lost. Also, removing the remainder of the training levee would cause the loss of potential upland

habitat. Any actions undertaken by DWR within the project area will be subject to endangered species consultation.

The VELB inhabits only elderberry shrubs throughout the Central Valley, primarily along riparian corridors. These shrubs would be impacted during rock armoring of the streambanks by the DWR. Any actions undertaken by DWR within the project area will be subject to endangered species consultation.

Palmate-bracted bird's beak populations have been documented southeast of the project area. Also, botanical field surveys show that potential habitat exists within this area. Although the project will have no direct or indirect affects on *C. palamatus*, there may be cumulative impacts from further industrial development. These impacts could be lessened using conservation measures listed in the Yolo County Habitat Conservation Plan (Draft, January 2001).

The Central Valley chinook salmon is an anadromous and semelparous (spawns only once then dies) fish that spends up to 2 years as a juvenile in freshwater before returning to the ocean. It then spends up to 6 years in the marine environment before returning to its home stream to spawn and then die. Freshwater stream for juveniles and spawning adults could potentially be impacted by the placement of a haul route culvert within the low-flow channel of the CCSB. Conservation measures would include following the *Guidelines for Salmonid Passage at Stream Crossings*. Salmon may also be impacted by any in-channel rock armoring by DWR. Any actions undertaken by DWR within the project area will be subject to endangered species consultation.

The Central Valley steelhead are an anadromous form of rainbow trout that spends one to four growing seasons in the ocean before returning to spawn for the first time in small streams and tributaries where cool, well oxygenated water, and gravelly stream channels occur in order to lay their eggs. Cover in the form of deep pools, overhanging and submerged vegetation, undercut banks and submerged debris is also important for the protection of spawning and hatching steelhead. Spawning and juvenile habitat may be impacted by the placement of culverts for the haul route within the CCSB low-flow channel. Conservation measures would include following the *Guidelines for Salmonid Passage at Stream Crossings*. Steelhead may also be impacted by any in-channel rock armoring by DWR. Any actions undertaken by DWR within the project area will be subject to endangered species consultation.

State

Construction of the FB may affect two State listed species through direct and indirect effects (see Table 5), and three State listed species through cumulative effects.

The Swainson's hawk nests in scattered large trees and forages in agricultural fields throughout the study area. Nesting hawks can be sensitive to construction activity, especially human activity near their nests, potentially causing nest abandonment. The FB Alternative would require the removal of several potential nesting trees, and may also result in nesting hawk disturbance. Therefore, the Swainson's hawk may be negatively affected by the FB Alternative. However, through conservation measures, such as pre-construction surveys, construction windows, and

habitat mitigation, any potentially adverse effects can be minimized. Cumulative effects would include the loss of nesting habitat during rock armoring of the streambanks by the DWR. Any actions undertaken by DWR within the project area will be subject to consultation with the California Department of Fish and Game.

The bank swallow is found primarily in riparian and other lowland habitats. It creates nests by burrowing into vertical banks, bluffs, and cliffs composed of fine-textured soils or sandy loams. These habitats would be impacted during rock armoring of the streambanks by the DWR. Any actions undertaken by DWR within the project area will be subject to consultation with the California Department of Fish and Game.

The northwestern pond turtle inhabits permanent bodies of freshwater with adequate hiding and basking sites. The turtle also uses upland habitats for aestivation, hibernation, and reproduction. These habitats would be impacted during construction and use of the haul route for removal of the CCSB training levee, and future rock armoring of the streambanks by the DWR. Conservation measures for the giant garter snake will provide sufficient avoidance, minimization, and mitigation measures for the northwestern pond turtle. Any actions undertaken by DWR within the project area will be subject to consultation with the California Department of Fish and Game.

Determination

Federal

The proposed project is not likely to adversely affect the following species: (1) valley elderberry longhorn beetle and (2) palmate-bracted bird's beak. The proposed project is likely to adversely affect the giant garter snake, fall/late fall and winter-run chinook salmon, and Central Valley steelhead. Conservation measures have been developed and will be incorporated into the project description. These conservation measures off-set/address potential project impacts.

State

The proposed project is not likely to adversely affect the bank swallow. The proposed project is likely to adversely affect the Swainson's hawk and northwestern pond turtle. Conservation measures have been developed and will be incorporated into the project description. These conservation measures off-set/address potential project impacts.

Table 4: Direct and Indirect Effects analysis of Federally listed species potentially within the project area.

Common Name	Scientific Name	Status	Effects Analysis				
			Species			Critical Habitat	
			No Effect	May Affect, Not Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Adversely Modify	Pending Future Site-Specific Analysis
Giant Garter Snake	<i>Thamnophis gigas</i>	ST/FT			*		
Valley Elderberry Longhorn Beetle	<i>Desmocerus californicus dimorphus</i>	FT	*				
Palmate-bracted Bird's Beak	<i>Cordylanthus palmatus</i>	SE/FE	*				
Central Valley Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	FE, FT, C			*		
Central Valley Steelhead	<i>Oncorhynchus mykiss</i>	FT			*		

Table 5: Direct and Indirect Effects analysis of State listed species potentially within the project area.

Common Name	Scientific Name	Status	Effects Analysis				
			Species			Critical Habitat	
			No Effect	May Affect, Not Likely to Adversely Affect	May Affect, Likely to Adversely Affect	May Adversely Modify	Pending Future Site-Specific Analysis
Swainson's Hawk	<i>Buteo swainsoni</i>	ST			*		
Bank Swallow	<i>Riparia riparia</i>	ST	*				
Northwestern Pond Turtle	<i>Clemmys marmorata marmorata</i>	SC			*		

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